A NEW SPECIES OF *CALCEOLARIA* (CALCEOLARIACEAE) FROM DISTURBED PARAMOS IN SOUTH ECUADOR

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ABSTRACT

Calceolaria molaui Puppo, sp. nov. is described and illustrated. The new species was collected in Loja, in disturbed paramos near the frontier with Peru so it would be expected to occur in northern Peru as well. It is characteristic for having hirsute indumentum composed of branched trichomes, ovate, subcoriaceous leaves with reticulate venation, cyme bracts absent, elaiophore absent, and brown, deflexed anthers, totally dehiscent. Due to its indumentum, leave shape, and anther morphology, *C. molaui* is placed in Section *Lehmannina* Pennell within subgenus *Calceolaria*. This is the only species of this section in southern Ecuador.

RESUMEN

Calceolaria molaui Puppo, sp. nov., es descrita e ilustrada. Esta nueva especie fue colectada en Loja, en páramos disturbados cerca de la frontera con Perú, por lo que podria encontrarse también en el Norte del Perú. Se caracteriza por tener indumento hirsuto compuesto de tricomas ramificados, hojas ovadas subcoriáceas con venación reticular, brácteas ausentes en la base de las cimas, elaióforo ausente, y anteras marrones, deflexas, totalmente dehiscentes. Debido a su indumento, hojas, y estambres, *C. molaui* es colocada como parte de la Sección *Lehmannina* Pennell dentro del subgénero *Calceolaria*. Esta es la única especie de esta sección descrita para el sur de Ecuador.

Calceolaria L. is the largest genus of the Calceolariaceae, comprising about 250 species distributed from central Mexico to southern Argentina. *Calceolaria* was formerly part of the Scrophulariaceae, but was raised to the family level together with *Porodittia* G. Don and *Jovellana* Ruiz & Pav. by Olmstead et al. (2001). Andersson (2006) found that *Porodittia* was nested within *Calceolaria*, leaving only two genera in the family.

Calceolaria is easily recognized by its yellow bilabiate flowers with saccate lower lip and two stamens (Molau & Sánchez-Vega 1986). Most of the species have a patch of glandular trichomes that produce oil. This structure is known as elaiophore (Vogel 1974) and is located in an infold of the lower lip in the corolla. *Calceolaria* species with an elaiophore are pollinated by specialized oil-gathering bees (Vogel 1974; Molau 1988; Rasmussen 1999; Sérsic 2004; Cosacov et al. 2009) while species lacking this structure are pollinated by common bees or bumblebees (Molau 1988; Sérsic 2004; Cosacov et al. 2009).

Calceolaria is subdivided in 3 subgenera and 22 sections (Molau 1988). Subgenus *Calceolaria* is the most frequent in the Neotropics, while subgenus *Cheiloncos* and *Rosula* are mainly distributed in the southern temperate. Many sections in Molau (1988) have been shown to be polyphyletic (Andersson 2006; Cosacov et al. 2009).

I here describe a new species collected in Loja, southern Ecuador that I detected during general identifications at the Missouri Botanical Garden in 2005.

Calceolaria molaui Puppo, sp. nov. (**Fig. 1**). TYPE: ECUADOR. LOJA: road Jimbura to Zumba, 3400 m, 6 Nov 2000, *P.M. Jørgensen et al. 2238* (HOLOTYPE: MO).

Suffrutex, caulibus strigosis, pilis ramosus fuscus eglandulosus. Folia decussata, peciolata; lamina subcoriacea, ovata, 2–2.7 × 1.2–1.9 cm, acuta, ad basin rotundata, margine crenatulus leviter revoluta; supra viridis, puberula; infra viridulus, reticulata venosa, in nervis hirsuta; petioli 2–3.5 mm longis, strigosi. Inflorescencia terminalis, numerosus cymarum; pedicelli 13–22 mm longis; bracteae cymarum desunt. Sepala viridis, ovata, 4–5 × 3–4 mm, acuta, puberula, intra tomentosum secus margines. Corolla flava, immaculata, labio superiore 5–7 × 6–8 mm, labio inferiore 9–15 × 7–9 mm; elaeophorus deest. Antherae fuscae, glabrae, 1.8–2.3 mm longis, totae dehiscentes; thecae aequales, deflexae; filamenta 1.4–1.5 mm longis. Stylus 4–4.5 mm longis. Capsulam conica, 5 mm longis, puberula, glutinosa.

Subshrub, stems strigose with ramified brown glandless hairs. Leaves decussate, petiolate; blades subco-

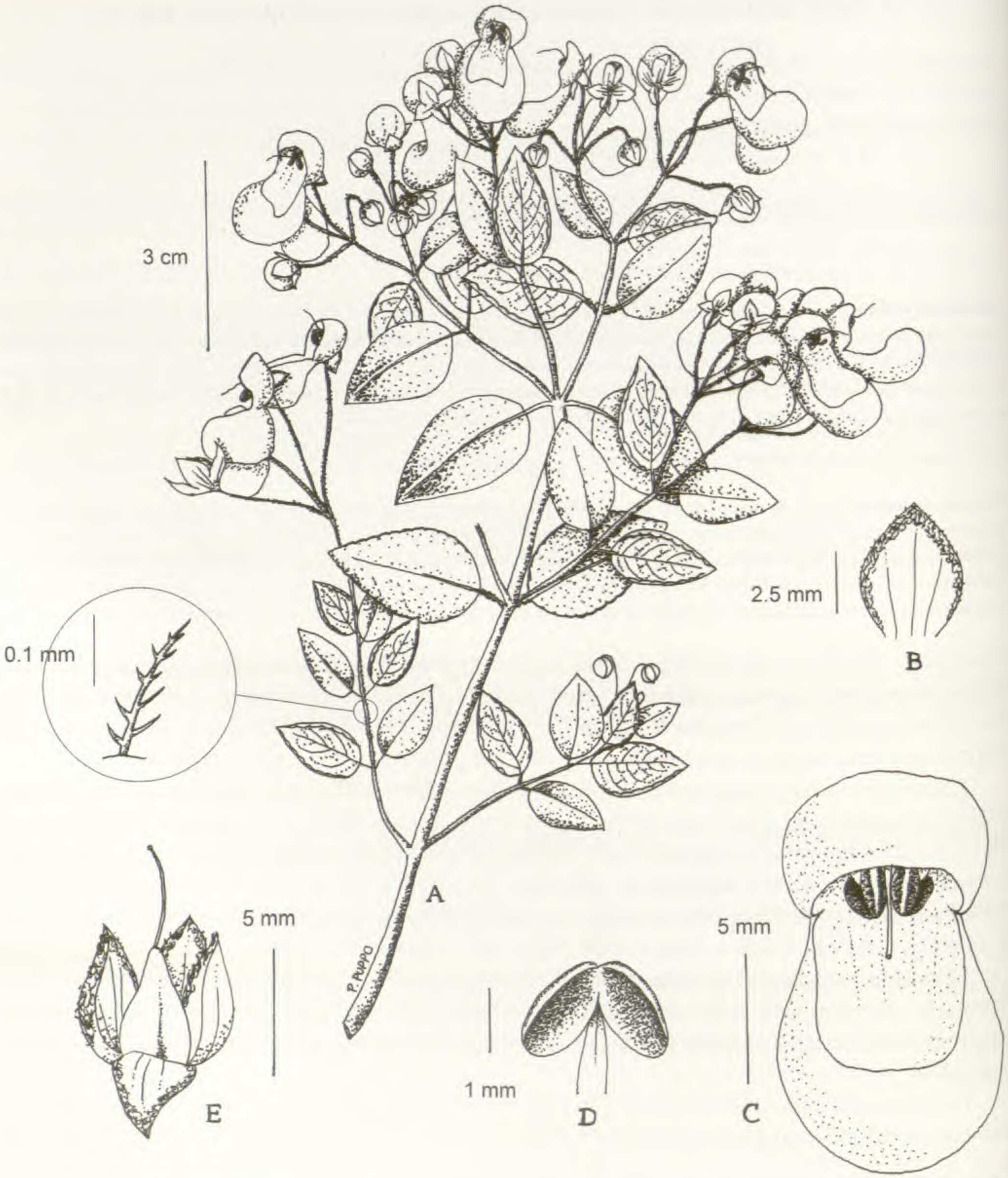

FIG. 1. *Calceolaria molaui* [*Jørgensen et al. 2238* (MO)]. **A.** Flowering branch with detail of a branched trichome. **B.** Sepal, abaxial view. **C.** Flower, frontal view. **D.** Stamen. **E.** Capsule.

riaceous, ovate, 2–2.7 × 1.2–1.9 cm, acute, rounded at base, the margins minutely crenate slightly revolute; upper surface green, puberulous; lower surface pale green, reticulate-venose, hirsute on the veins; petioles 2–3.5 mm long, strigose. Inflorescence terminal, composed of several cymes; pedicels 13–22 mm long; cyme bracts absent. Sepals green, ovate, 4–5 × 3–4 mm, acute, puberulous in both surfaces, internally densely pubescent on the margins. Corolla yellow, unspotted, upper lip 5–7 × 6–8 mm, lower lip 9–15 × 7–9 mm wide; elaiophore absent. Anthers brown, glabrous, 1.8–2.3 mm long, dehiscent throughout; the

thecae equal, deflexed; filaments 1.4–1.5 mm long. Style 4–4.5 mm long. Capsules conical, 5 mm long, puberulous, glutinous.

Distribution and ecology.—This species is known only from the type locality in Loja. It was collected in disturbed paramo with patches of Andean forest at 3400 m. The area in which *Calceolaria molaui* was collected is near the border with Peru, it is therefore expected to occur in northern Peru as well.

Etymology.—The species is named after Ulf Molau, who has contributed to the knowledge of *Calceolaria* for several years.

DISCUSSION

Following the last treatment of *Calceolaria* (Molau 1988), *C. molaui* is placed in section *Lehmannina* Pennell because of its subshrub habit, subcoriaceous leaves, anthers totally dehiscent, and especially its hirsute indumentum. The species of this section are distributed from northern Colombia to southeastern Peru, growing in humid habitats usually above 2000 m (Molau 1988). This section however, has also appeared as polyphyletic in phylogenies presented by Andersson (2006) and Cosacov et al. (2009).

Although *C. molaui* is known only from the type specimen, it has a particularly combination of characters that makes it a clearly distinct species. The plant is covered with branched trichomes, the leaves are subcoriaceous and rounded at base, the cyme bracts are absent, the corolla lacks an elaiophore, and the anthers are deflexed. This is the first time that branched trichomes are described for *Calceolaria* thus constituting a unique character within this genus.

Other species from section *Lehmannina* present in Ecuador are: *C. cataractarum* Molau, *C. frondosa* Molau, *C. lehmanniana* Kraenzl., *C. martinezii* Kraenzl. and *C. pedunculata* Molau, all of these from northern and central Ecuador (Molau 1988; Jørgensen & León-Yánez 1999). *Calceolaria cataractarum* has elliptic or lanceolate leaf blades and the flower has an elaiophore. In *C. lehmanniana* the leaves are also elliptic or lanceolate but the corolla is white. In *C. molaui* the leaves are ovate, the corolla is yellow, and the elaiophore is absent. *Calceolaria frondosa* has herbaceous leaves less than 2 cm long, and the elaiophore is present while in *C. molaui* the leaves are subcoriaceous larger than 2 cm, and the elaiophore is absent. *Calceolaria martinezii* has lanceolate leaves, an upfolded lower lip that closes the corolla, and ascending thecae whereas *C. molaui* has ovate leaves, an open corolla, and deflexing thecae. Finally, *C. pedunculata* has glabrous leaves and triangular sepals while *C. molaui* has hairy leaves and the sepals are ovate.

Species from this section present in Northern Peru are *C. luteocalyx* Edwin and *C. hirsuta* Molau. *Calceolaria luteocalyx* has herbaceous leaves, yellow-green or brightly yellow sepals more than 9 mm long, the corolla is closed and the elaiophore is present. *Calceolaria hirsuta* has also herbaceous leaves, and the sepals are glabrous abaxially. Both species are restricted to the department of Amazonas in Northern Peru. *Calceolaria molaui* has subcoriaceous leaves, green sepals less than 5 mm long densely pubescent on the abaxial margins, open corolla and elaiophore absent.

Other species possibly related to *C. molaui* are *C. phaeotricha* Molau and *C. fusca* Pennel from section *Salicifoliae*. *Calceolaria phaeotricha* is restricted to a small area of the Cordillera Oriental in Ecuador while *C. fusca* occurs from South Colombia to North Peru. *Calceolaria phaeotricha* has simple trichomes only at the base of the petioles and upper branches. It has glabrous, glutinous leaves with pinnate venation, the cyme bracts are present, and the anthers are pale yellow. *Calceolaria molaui* is covered with branched trichomes, has hirsute, non glutinous leaves with reticulate venation, the cyme bracts are absent, and the anthers are brown. *Calceolaria fusca* has a closed corolla and elaiophore present while *C. molaui* has an open corolla and elaiophore absent.

Conservation status.—In Ecuador, the paramos are highly disturbed due to anthropogenic activities such as agriculture, provoked fires, cattle, reforestation with alien species, among others (Quizhpe et al. 2002). *Calceolaria molaui* was collected in the southern paramos and should be consider as a critically endangered species (CR) under the B2ab(iii) criteria of the IUCN (2001).

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